What we claim is:

1. A method of reducing a noise component of an input speech signal comprised of signal frames on a channel comprising the steps of:

(a) applying a windowed Fourier transformation to said signal frames;

(b) approximating signal magnitudes of said signal frames;

(c) computing Signal-to-Noise Ratio magnitudes of said signal frames;

(d) detecting voice activity in said channel;

(e) detecting noise activity in said channel;

(f) estimating gain in said signal frames;

(g) applying an estimated noise history to said signal frames to compute a spectral gain function;

(h) applying said spectral gain function to the components of said windowed Fourier transformation; and,

(i) applying an inverse Fourier transform to said signal frames thereby reconstructing a noise reduced output signal frame.

2. The method of Claim 1 wherein said estimated noise history is retrieved from a database.

3. The method of Claim 1 wherein said estimated noise history is sampled from said signal frames.

4. The method of Claim 1 wherein said signal frames are overlapped and added to previous signal frames.

5. The method of Claim 1 comprising the step of filtering said Signal-to-Noise Ratio magnitude and signal magnitude prior to detecting voice activity in said channel.

6. The method of Claim 1 comprising the step of applying a windowed Fourier transform on said noise reduced output signal frame.

7. The method of Claim 1 wherein said detecting voice activity comprises conditional comparisons of received Signal-to-Noise Ratios and average Signal-to-Noise Ratio thresholds.

8. The method of Claim 1 wherein said noise component is Gaussian.

9. The method of Claim 1 wherein said noise component is ramped.

10. The method of Claim 1 wherein said noise component is non-stationary.

11. The method of Claim 1 comprising the step of sampling a slew rate of said noise reduced output signal frame.

12. The method of Claim 11 wherein the step of sampling a slew rate comprises the steps of:

(a) starting a counter;

(b) adjusting the sampled slew rate;

(c) encoding a noise sample;

(d) updating a noise histogram;

(e) normalizing said noise histogram;

(f) computing a weighted histogram bin;

(g) decoding a noise estimate;

(h) updating said counter; and,

(i) deciding to continue said sampling.

13. The method of Claim 12 wherein the adjusting of the sampled slew rate is responsive to a measured error period.

14. The method of Claim 12 wherein said counter resets.

15. The method of Claim 12 wherein said noise reduced output signal frame is overlapped and added to previous noise reduced output signal frames.

16. The method of Claim 12 wherein the step of filtering said average noise filters noise from the noise reduced output signal frame.

17. The method of Claim 16 wherein the step of filtering said average noise comprises adapting a post-processed noise level to an acceptable level.

18. The method of Claim 12 wherein the entire process is repeated responsive to the presence of additional input speech signals or signal frames.

19. The method of Claim 1 wherein said noise reduced output signal frame is overlapped and added to previous noise reduced output signals frames.

20. The method of Claim 1 wherein average noise is filtered from the noise reduced output signal frame.

21. The method of Claim 20 wherein the step of filtering said average noise comprises adapting a post-processed noise level to an acceptable level.

22. The method of Claim 1 wherein the entire process is repeated responsive to the presence

of additional input speech signals or signal frames.

23. In a method of filtering a noise component from an input speech signal comprised of signal frames the improvement comprising the steps of :

(a) estimating said noise component present in the input speech signal;

(b) modifying said input speech signal based on an estimation of the noise component;

(c) identifying speech segments from said noise component; and,

(d) adapting a post-processed noise component to an acceptable, noise-reduced level.

24. The method of Claim 23 wherein said noise component is ramping in amplitude.

25. The method of Claim 23 wherein said noise component is Gaussian.

26. The method of Claim 23 wherein said noise component is non-stationary.

27. The method of Claim 23 wherein step (c) further comprises the steps of:

(a) using an estimated noise histogram and/or a generated noise histogram compute a spectral gain function;

(b) applying said spectral gain function to the real and imaginary components of a Fourier transform of said input speech signal; and,

(c) processing said Fourier transform by an inverse Fourier transform thereby reconstructing a noise reduced speech signal.

28. A system for noise cancellation comprising:

(a) a first input means operably connected to a processor said first input means

receiving a speech signal;

(b) a second input means operably connected to said processor wherein historical speech and noise data may be entered into a control and storage means for access by said processor;

(c) an output means operably connected to said processor said output means expressing an output speech signal; and,

(d) a processing means operably connected to said first and second input means and said output means, said processing means comprising a control and storage means, a first filtering means, a second filtering means, a voice activity detector, a noise step detector, and a sampling and adjustment means.

29. The system of Claim 28 wherein said first filtering means filters Signal-to-Noise Ratio magnitudes and signal magnitudes.

30. The system of Claim 28 wherein said voice activity detector detects and attacks noise activity on a frequency channel.

31. The system of Claim 30 wherein said noise activity is ramping, non-stationary, or both.

32. The system of Claim 28 wherein said noise step detector detects and attacks a stepping noise component on said frequency channel.

33. The system of Claim 28 wherein said sampling and adjustment means samples and adjusts a slew rate and a histogram of said output speech signal.

34. The system of Claim 28 wherein said second filtering means adapts a post-processed

noise level to an acceptable level.

35. A method of noise cancellation in a received speech signal comprised of signal frames comprising the steps of:

(a) applying a windowed Fourier transform to said signal frames;

(b) estimating a noise component present in said signal frames;

(c) modifying said signal frames based on a calculated noise estimate;

(d) identifying speech segments from said noise component; and,

(e) adapting a post-processed noise level to an acceptable level.

36. The method of Claim 35 wherein step (b) further comprises the steps of:

(a) approximating magnitudes of said signal frames;

(b) computing Signal-to-Noise Ratio magnitudes of said signal frames;

(c) detecting any noise components on a channel;

(d) detecting a stepping noise component on said channel; and,

(e) estimating a gain in said noise component.

37. The method of 36 wherein said noise components comprises ramping noise components, non-stationary noise components, or both.

38. The method of Claim 35 wherein step (c) further comprises the step of computing a spectral gain function from an estimated noise history.

39. The method of Claim 38 further comprising the steps of:

(a) applying said spectral gain function to the real and imaginary components of a

Fourier transform of said signal frames; and,

(b) applying an inverse Fourier transform thereby reconstructing noise reduced signal frames.

40. The method of Claim 35 wherein the step of identifying speech segments from said noise component further comprises applying a windowed Fourier transform on an output signal frame.

41. The method of Claim 35 wherein adapting a post-processed noise component to an acceptable level further comprises filtering average noise from an output signal frame.

42. The method of Claim 35 wherein said noise component is ramping in amplitude.

43. The method of Claim 35 wherein said noise component is Gaussian.

44. The method of Claim 35 wherein said noise component is non-stationary.